# CLAIMS

WHAT IS CLAIMED IS:

1. A process to produce polymers comprising contacting one or more monomer(s), a catalyst system, and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor comprising a bayonette.

2. The process of claim 1, wherein the process is a slurry polymerization process and the reactor is a tubular reactor.

3. The process of any of the preceding claims, wherein the reactor further comprises a vertical cylindrical housing, an upper part, and a lower part.

4. The process of claim 3, wherein the reactor further comprises connecting pipes for delivery of the catalyst system in the lower part, and connecting pipes for the removal of the polymer in the upper part.

5. The process of any of the preceding claims, wherein the reactor further comprises a shaft with blade mixers mounted along the height of the shaft.

6. The process of any of the preceding claims, wherein the bayonette comprises a plurality of tubes.

7. The process of claim 6, wherein the tubes comprise sectors.

8. The process of any of the preceding claims, wherein the bayonette comprises tube disks and tube baffles.

9. The process of claim 8, wherein the tube baffles comprise spaces between the sectors.

10. The process of claim 8 or 9, wherein the tube baffles comprise holes.

11. The process of any of claims 8-10, wherein the reactor comprises a catalyst system delivery tube comprising an open end, the open end located in the space between the tube baffles.

12. The process of claim 11, wherein the open end of the catalyst system delivery tube is angled in a downward direction toward a mixer.

13. The process of any of claims 8-10, wherein the reactor comprises one or more catalyst system delivery tube(s) comprising open ends.

14. The process of claim 13, wherein at least one open end is angled in a downward direction toward a mixer.

15. The process of any of the preceding claims, wherein the reactor comprises a mixer located adjacent to a tube baffle.

16. The process of any of the preceding claims, wherein the one or more monomer(s) comprise an isoolefin, preferably isobutylene, and a multiolefin, preferably a conjugated diene, more preferably isoprene.

17. The process of any of the preceding claims, where the one or more monomer(s) comprise an isoolefin, preferably isobutylene, and an alkylstyrene, preferably methylstyrene, more preferably *para*-methylstyrene.

18. The process of any of the preceding claims, wherein one or more hydrofluorocarbon(s) is represented by the formula: $C_xH_yF_z$ wherein x is an integer from 1 to 40 and y and z are integers of one or more.

19. The process of claim 18, wherein x is from 1 to 10.

20. The process of claim 18, wherein x is from 1 to 6.

21. The process of claim 18, wherein x is from 1 to 3.

22. The process of any of claims 1-17, wherein the one or more hydrofluorocarbon(s) is independently selected from the group consisting of fluoromethane; difluoromethane; trifluoromethane; fluoroethane; 1,1-difluoroethane; 1,2-difluoroethane; 1,1,1-trifluoroethane; 1,1,2-trifluoroethane; 1,1,1,2-tetrafluoroethane; 1,1,2,2-tetrafluoroethane; 1,1,1,2,2-pentafluoroethane; 1-fluoropropane; 2-fluoropropane; 1,1-difluoropropane; 1,2-difluoropropane; 1,3-difluoropropane; 2,2-difluoropropane; 1,1,1-trifluoropropane; 1,1,2-trifluoropropane; 1,1,3-trifluoropropane; 1,2,2-trifluoropropane; 1,2,3-trifluoropropane; 1,1,1,2-tetrafluoropropane; 1,1,1,3-tetrafluoropropane; 1,1,2,2-tetrafluoropropane; 1,1,2,3-tetrafluoropropane; 1,1,3,3-tetrafluoropropane; 1,2,2,3-tetrafluoropropane; 1,1,1,2,2-pentafluoropropane; 1,1,1,2,3-pentafluoropropane; 1,1,1,3,3-pentafluoropropane; 1,1,2,2,3-pentafluoropropane; 1,1,2,3,3-pentafluoropropane; 1,1,1,2,2,3-hexafluoropropane; 1,1,1,2,3,3-hexafluoropropane; 1,1,1,3,3,3-hexafluoropropane; 1,1,1,2,2,3,3-heptafluoropropane; 1,1,1,2,3,3,3-heptafluoropropane; 1-fluorobutane; 2-fluorobutane; 1,1-difluorobutane; 1,2-difluorobutane; 1,3-difluorobutane; 1,4-difluorobutane; 2,2-difluorobutane; 2,3-difluorobutane; 1,1,1-trifluorobutane; 1,1,2-trifluorobutane; 1,1,3-trifluorobutane; 1,1,4-trifluorobutane; 1,2,2-trifluorobutane; 1,2,3-trifluorobutane; 1,3,3-trifluorobutane; 2,2,3-trifluorobutane; 1,1,1,2-tetrafluorobutane; 1,1,1,3-tetrafluorobutane; 1,1,1,4-tetrafluorobutane; 1,1,2,2-tetrafluorobutane; 1,1,2,3-tetrafluorobutane; 1,1,2,4-tetrafluorobutane; 1,1,3,3-tetrafluorobutane; 1,1,3,4-tetrafluorobutane; 1,1,4,4-tetrafluorobutane; 1,2,2,3-tetrafluorobutane; 1,2,2,4-tetrafluorobutane; 1,2,3,3-tetrafluorobutane; 1,2,3,4-tetrafluorobutane; 2,2,3,3-tetrafluorobutane; 1,1,1,2,2-

pentafluorobutane; 1,1,1,2,3-pentafluorobutane; 1,1,1,2,4-pentafluorobutane; 1,1,1,3,3-pentafluorobutane; 1,1,1,3,4-pentafluorobutane; 1,1,1,4,4-pentafluorobutane; 1,1,2,2,3-pentafluorobutane; 1,1,2,2,4-pentafluorobutane; 1,1,2,3,3-pentafluorobutane; 1,1,2,4,4-pentafluorobutane; 1,1,3,3,4-pentafluorobutane; 1,2,2,3,3-pentafluorobutane; 1,2,2,3,4-pentafluorobutane; 1,1,1,2,2,3-hexafluorobutane; 1,1,1,2,2,4-hexafluorobutane; 1,1,1,2,3,3-hexafluorobutane, 1,1,1,2,3,4-hexafluorobutane; 1,1,1,2,4,4-hexafluorobutane; 1,1,1,3,3,4-hexafluorobutane; 1,1,1,3,4,4-hexafluorobutane; 1,1,1,4,4,4-hexafluorobutane; 1,1,2,2,3,3-hexafluorobutane; 1,1,2,2,3,4-hexafluorobutane; 1,1,2,2,4,4-hexafluorobutane; 1,1,2,3,3,4-hexafluorobutane; 1,1,2,3,4,4-hexafluorobutane; 1,2,2,3,3,4-hexafluorobutane; 1,1,1,2,2,3,3-heptafluorobutane; 1,1,1,2,2,4,4-heptafluorobutane; 1,1,1,2,2,3,4-heptafluorobutane; 1,1,1,2,3,3,4-heptafluorobutane; 1,1,1,2,3,4,4-heptafluorobutane; 1,1,1,2,4,4,4-heptafluorobutane; 1,1,1,3,3,4,4-heptafluorobutane; 1,1,1,2,2,3,3,4-octafluorobutane; 1,1,1,2,2,3,4,4-octafluorobutane; 1,1,1,2,3,3,4,4-octafluorobutane; 1,1,1,2,2,4,4,4-octafluorobutane; 1,1,1,2,3,4,4,4-octafluorobutane; 1,1,1,2,2,3,3,4,4-nonafluorobutane; 1,1,1,2,2,3,4,4,4-nonafluorobutane; 1-fluoro-2-methylpropane; 1,1-difluoro-2-methylpropane; 1,3-difluoro-2-methylpropane; 1,1,1-trifluoro-2-methylpropane; 1,1,3-trifluoro-2-methylpropane; 1,3-difluoro-2-(fluoromethyl)propane; 1,1,1,3-tetrafluoro-2-methylpropane; 1,1,3,3-tetrafluoro-2-methylpropane; 1,1,3-trifluoro-2-(fluoromethyl)propane; 1,1,1,3,3-pentafluoro-2-methylpropane; 1,1,3,3-tetrafluoro-2-(fluoromethyl)propane; 1,1,1,3-tetrafluoro-2-(fluoromethyl)propane; fluorocyclobutane; 1,1-difluorocyclobutane; 1,2-difluorocyclobutane; 1,3-difluorocyclobutane; 1,1,2-trifluorocyclobutane; 1,1,3-trifluorocyclobutane; 1,2,3-trifluorocyclobutane; 1,1,2,2-tetrafluorocyclobutane; 1,1,3,3-tetrafluorocyclobutane; 1,1,2,2,3-pentafluorocyclobutane; 1,1,2,3,3-pentafluorocyclobutane; 1,1,2,2,3,3-

hexafluorocyclobutane; 1,1,2,2,3,4-hexafluorocyclobutane; 1,1,2,3,3,4-hexafluorocyclobutane; 1,1,2,2,3,3,4-heptafluorocyclobutane and mixtures thereof.

23. The process of any of claims 1-17, wherein the one or more hydrofluorocarbon(s) is independently selected from monofluoromethane, difluoromethane, trifluoromethane, monofluoroethane, 1,1-difluoroethane, 1,1,1-trifluoroethane, 1,1,1,2-tetrafluoroethane, 1,1,1,2,2, pentafluoroethane, and mixtures thereof.

24. The process of any of the preceding claims, wherein the diluent comprises from 15 to 100 volume % HFC based upon the total volume of the diluent.

25. The process of any of the preceding claims, wherein the diluent comprises from 20 to 100 volume % HFC based upon the total volume of the diluent.

26. The process of any of the preceding claims, wherein the diluent comprises from 25 to 100 volume % HFC based upon the total volume of the diluent.

27. The process of any of the preceding claims, wherein the diluent further comprises a hydrocarbon, a non-reactive olefin, and/or an inert gas.

28. The process of claim 27, wherein the hydrocarbon is a halogenated hydrocarbon other than an HFC.

29. The process of claim 28, wherein the halogenated hydrocarbon is methyl chloride.

30. The process of any of the preceding claims, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $MX_4$;
wherein M is a Group 4, 5, or 14 metal; and
each X is a halogen.

31. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $MR_nX_{4-n}$;
wherein M is Group 4, 5, or 14 metal;
each R is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;
*n* is an integer from 0 to 4; and
each X is a halogen.

32. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $M(RO)_nR'_mX_{4-(m+n)}$;
wherein M is Group 4, 5, or 14 metal;
each RO is a monovalent $C_1$ to $C_{30}$ hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;
each R' is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;
*n* is an integer from 0 to 4;
*m* is an integer from 0 to 4, wherein the sum of *n* and *m* is not more than 4; and
each X is a halogen.

33. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $M(RC{=}OO)_nR'_mX_{4-(m+n)}$;
wherein M is Group 4, 5, or 14 metal;
each RC=OO is a monovalent $C_2$ to $C_{30}$ hydrocarbacyl radical independently selected from the group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each R' is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;
*n* is an integer from 0 to 4;
*m* is an integer from 0 to 4, wherein the sum of *n* and *m* is not more than 4; and
each X is a halogen.

34. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $MOX_3$;
wherein M is a Group 5 metal; and
each X is a halogen.

35. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $MX_3$;
wherein M is a Group 13 metal; and
each X is a halogen.

36. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $MR_nX_{3-n}$ ;
wherein M is a Group 13 metal;
each R is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;
*n* is an integer from 1 to 3; and
each X is a halogen.

37. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $M(RO)_nR'_mX_{3-(m+n)}$;
wherein M is a Group 13 metal;

each RO is a monovalent $C_1$ to $C_{30}$ hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;

each R' is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

*n* is an integer from 0 to 3;

*m* is an integer from 0 to 3, wherein the sum of *n* and *m* is from 1 to 3; and

each X is a halogen.

38. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $M(RC{=}OO)_nR'_mX_{3-(m+n)}$;

wherein M is a Group 13 metal;

each RC=OO is a monovalent hydrocarbacyl radical independently selected from the group independently selected from the $C_2$ to $C_{30}$ group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each R' is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

*n* is an integer from 0 to 3;

*m* is a integer from 0 to 3, wherein the sum of *n* and *m* is from 1 to 3; and

each X is a halogen.

39. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $MX_y$;

wherein M is a Group 15 metal;

each X is a halogen; and

*y* is 3, 4 or 5.

40. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $MR_nX_{y-n}$;
wherein M is a Group 15 metal;
each R is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;
*n* is an integer from 0 to 4;
*y* is 3, 4 or 5, wherein n is less than y; and
each X is a halogen.

41. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $M(RO)_nR'_mX_{y-(m+n)}$;
wherein M is a Group 15 metal,
each RO is a monovalent $C_1$ to $C_{30}$ hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;
each R' is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;
*n* is an integer from 0 to 4;
*m* is an integer from 0 to 4;
*y* is 3, 4 or 5, wherein the sum of *n* and *m* is less than y; and
each X is a halogen.

42. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) represented by the formula $M(RC{=}OO)_nR'_mX_{y-(m+n)}$;
wherein M is a Group 15 metal;
each RC=OO is a monovalent $C_2$ to $C_{30}$ hydrocarbacyloxy radical independently selected from the group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each R' is a monovalent $C_1$ to $C_{12}$ hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;
*n* is an integer from 0 to 4;
*m* is an integer from 0 to 4;
*y* is 3, 4 or 5, wherein the sum of *n* and *m* is less than y; and
each X is a halogen.

43. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) independently selected from the group consisting of titanium tetrachloride, titanium tetrabromide, vanadium tetrachloride, tin tetrachloride, zirconium tetrachloride, titanium bromide trichloride, titanium dibromide dichloride, vanadium bromide trichloride, tin chloride trifluoride, benzyltitanium trichloride, dibenzyltitanium dichloride, benzylzirconium trichloride, dibenzylzirconium dibromide, methyltitanium trichloride, dimethyltitanium difluoride, dimethyltin dichloride, phenylvanadium trichloride, methoxytitanium trichloride, n-butoxytitanium trichloride, di(isopropoxy)titanium dichloride, phenoxytitanium tribromide, phenylmethoxyzirconium trifluoride, methyl methoxytitanium dichloride, methyl methoxytin dichloride, benzyl isopropoxyvanadium dichloride, acetoxytitanium trichloride, benzoylzirconium tribromide, benzoyloxytitanium trifluoride, isopropoyloxytin trichloride, methyl acetoxytitanium dichloride, benzyl benzoyloxyvanadium chloride, vanadium oxytrichloride, aluminum trichloride, boron trifluoride, gallium trichloride, indium trifluoride, ethylaluminum dichloride, methylaluminum dichloride, benzylaluminum dichloride, isobutylgallium dichloride, diethylaluminum chloride, dimethylaluminum chloride, ethylaluminum sesquichloride, methylaluminum sesquichloride , trimethylaluminum, triethylaluminum, methoxyaluminum dichloride, ethoxyaluminum dichloride, 2,6-di-tert-butylphenoxyaluminum dichloride, methoxy methylaluminum chloride, 2,6-di-tert-butylphenoxy methylaluminum chloride, isopropoxygallium

dichloride, phenoxy methylindium fluoride, acetoxyaluminum dichloride, benzoyloxyaluminum dibromide, benzoyloxygallium difluoride, methyl acetoxyaluminum chloride, isopropoyloxyindium trichloride, antimony hexachloride, antimony hexafluoride, arsenic pentafluoride, antimony chloride pentafluoride, arsenic trifluoride, bismuth trichloride arsenic fluoride tetrachloride, tetraphenylantimony chloride, triphenylantimony dichloride, tetrachloromethoxyantimony, dimethoxytrichloroantimony, dichloromethoxyarsine, chlorodimethoxyarsine, difluoromethoxyarsine, acetatotetrachloroantimony, (benzoato) tetrachloroantimony, and bismuth acetate chloride.

44. The process of any of claims 1-29, wherein the catalyst system comprises one or more Lewis acid(s) independently selected from the group consisting of aluminum trichloride, aluminum tribromide, ethylaluminum dichloride, ethylaluminum sesquichloride, diethylaluminum chloride, methylaluminum dichloride, methylaluminum sesquichloride, dimethylaluminum chloride, boron trifluoride, and titanium tetrachloride.

45. The process of any of claims 1-29, wherein the catalyst system comprises a Lewis acid that is not a compound represented by formula $MX_3$, where M is a group 13 metal, X is a halogen.

46. The process of any of the preceding claims, wherein the catalyst system comprises a hydrogen halide, a carboxylic acid, a carboxylic acid halide, a sulfonic acid, an alcohol, a phenol, a polymeric halide, a tertiary alkyl halide, a tertiary aralkyl halide, a tertiary alkyl ester, a tertiary aralkyl ester, a tertiary alkyl ether, a tertiary aralkyl ether, an alkyl halide, an aryl halide, an alkylaryl halide or an arylalkylacid halide.

47. The process of any of claims 1-45, wherein the catalyst system comprises one or more initiator(s) independently selected from the group consisting

of HCl, $H_2O$, methanol, $(CH_3)_3CCl$, $C_6H_5C(CH_3)_2Cl$, (2-Chloro-2,4,4-trimethylpentane) and 2-chloro-2-methylpropane.

48. The process of any of claims 1-45, wherein the catalyst system comprises one or more initiator(s) independently selected from the group consisting of hydrogen chloride, hydrogen bromide, hydrogen iodide, acetic acid, propanoic acid, butanoic acid; cinnamic acid, benzoic acid, 1-chloroacetic acid, dichloroacetic acid, trichloroacetic acid, trifluoroacetic acid, p-chlorobenzoic acid, p-fluorobenzoic acid, acetyl chloride, acetyl bromide, cinnamyl chloride, benzoyl chloride, benzoyl bromide, trichloroacetylchloride, trifluoroacetylchloride, p-fluorobenzoylchloride, methanesulfonic acid, trifluoromethanesulfonic acid, trichloromethanesulfonic acid, p-toluenesulfonic acid, methanesulfonyl chloride, methanesulfonyl bromide, trichloromethanesulfonyl chloride, trifluoromethanesulfonyl chloride, p-toluenesulfonyl chloride, methanol, ethanol, propanol, 2-propanol, 2-methylpropan-2-ol, cyclohexanol, benzyl alcohol, phenol, 2-methylphenol, 2,6-dimethylphenol, p-chlorophenol, p-fluorophenol, 2,3,4,5,6-pentafluorophenol, and 2-hydroxynaphthalene.

49. The process of any of claims 1-45, wherein the catalyst system comprises one or more initiator(s) independently selected from the group consisting of 2-chloro-2,4,4-trimethylpentane; 2-bromo-2,4,4-trimethylpentane; 2-chloro-2-methylpropane; 2-bromo-2-methylpropane; 2-chloro-2,4,4,6,6-pentamethylheptane; 2-bromo-2,4,4,6,6-pentamethylheptane; 1-chloro-1-methylethylbenzene; 1-chloroadamantane; 1-chloroethylbenzene; 1, 4-bis(1-chloro-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-chloro-1-methylethyl) benzene; 2-acetoxy-2,4,4-trimethylpentane; 2-benzoyloxy-2,4,4-trimethylpentane; 2-acetoxy-2-methylpropane; 2-benzoyloxy-2-methylpropane; 2-acetoxy-2,4,4,6,6-pentamethylheptane; 2-benzoyl-2,4,4,6,6-pentamethylheptane; 1-acetoxy-1-methylethylbenzene; 1-aceotxyadamantane; 1-benzoyloxyethylbenzene; 1,4-bis(1-acetoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-acetoxy-1-methylethyl)

benzene; 2-methoxy-2,4,4-trimethylpentane; 2-isopropoxy-2,4,4-trimethylpentane; 2-methoxy-2-methylpropane; 2-benzyloxy-2-methylpropane; 2-methoxy-2,4,4,6,6-pentamethylheptane; 2-isopropoxy-2,4,4,6,6-pentamethylheptane; 1-methoxy-1-methylethylbenzene; 1-methoxyadamantane; 1-methoxyethylbenzene; 1,4-bis(1-methoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-methoxy-1-methylethyl) benzene, and 1,3,5-tris(1-chloro-1-methylethyl) benzene.

50. The process of any of the preceding claims, wherein the catalyst system comprises a weakly-coordinating anion.

51. The process of any of the preceding claims, wherein the one or more initiator(s) comprise greater than 30 ppm water (based upon weight).

52. The process of any of the preceding claims, wherein the one or more monomer(s) is independently selected from the group consisting of olefins, alpha-olefins, disubstituted olefins, isoolefins, conjugated dienes, non-conjugated dienes, styrenics, substituted styrenics, and vinyl ethers.

53. The process of any of the preceding claims, wherein the one or more monomer(s) is independently selected from the group consisting of isobutylene, styrene, para-alkylstyrene, para-methylstyrene, alpha-methyl styrene, divinylbenzene, diisopropenylbenzene, isobutylene, 2-methyl-1-butene, 3-methyl-1-butene, 2-methyl-2-pentene, isoprene, butadiene, 2,3-dimethyl-1,3-butadiene, ß-pinene, myrcene, 6,6-dimethyl-fulvene, hexadiene, cyclopentadiene, methyl cyclopentadiene, piperylene, methyl vinyl ether, ethyl vinyl ether, and isobutyl vinyl ether.

54. The process of any of the preceding claims, wherein the one or more monomer(s) comprise at least 80 wt% isobutylene based upon the total weight of the one or more monomer(s).

55. The process of any of the preceding claims, wherein the polymerization temperature is from 15°C to -100°C.

56. The process of any of the preceding claims, wherein the polymerization temperature is from -30°C to -70°C.

57. The process of any of the preceding claims, wherein the polymerization temperature is from -40°C to -60°C.

58. The use of a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in the process of any of the preceding claims.

59. A polymer produced by the process of any of the preceding claims.